WHAT IS CLAIMED IS:

1. A method for forming a silicon oxide layer over a substrate disposed in a high density plasma substrate processing chamber, said method comprising:

flowing a process gas into the substrate processing chamber, said process gas comprising a silicon-containing source, an oxygen-containing source and a fluorine-containing source;

forming a plasma from said process gas; and

heating the substrate to a temperature above 450°C during deposition of said silicon oxide layer.

2. The method of claim 1 wherein the substrate is heated to a temperature above 500°C during deposition of said silicon oxide layer.

3. The method of claim 1 wherein the substrate is maintained at a temperature between 500-600°C during deposition of said silicon oxide layer.

4. The method of claim 1 wherein said silicon-containing gas is SiH_4.

5. The method of claim 1 wherein said oxygen-containing source is O_2.

6. The method of claim 1 wherein said silicon oxide layer has a fluorine content of less than 1.0 at. %.

7. The method of claim 6 wherein said fluorine-containing source is either NF_3 or a fluorocarbon having a formula of C_nF_{2n+2} where n is a positive integer.

8. The method of claim 7 wherein the plasma has an ion density of at least 1×10^{11} ions/cm^3.

9. The method of claim 1 wherein a flow ratio of said oxygen-containing source to said silicon-containing source is between 1.4-3.0:1 inclusive.

10. A method for forming a silicon oxide layer over a substrate disposed in a high density plasma substrate processing chamber, said method comprising:

(a) flowing a first gas into the substrate processing chamber;

(b) forming a plasma having an ion density of at least 1×10^{11} ions/cm^3 from said first gas and allowing said plasma to heat said substrate;

(c) thereafter, flowing a process gas comprising a silicon-containing source, an oxygen-containing source and a fluorine-containing source into said substrate processing chamber; and

(d) forming a plasma having an ion density of at least 1×10^{11} ions/cm^3 from said process gas and allowing said plasma to heat said substrate to a temperature at or above 450°C during deposition of said silicon oxide layer.

11. The method of claim 10 wherein said oxygen-containing source is O_2 and said silicon-containing source is SiH_4.

12. The method of claim 11 wherein said first gas comprises one or more of argon and O_2.

13. The method of claim 10 wherein said fluorine-containing source is either NF_3 or a gas having the formula of C_nF_{2n+2} where n is a positive integer.

14. The method of claim 13 wherein a flow ratio of said oxygen-containing source to said silicon-containing source is between 1.4-3.0:1 inclusive.

15. The method of claim 10 wherein said silicon oxide layer has a fluorine content of less than 1.0 at. %.

16. The method of claim 10 wherein in (d) said plasma heats said substrate to a temperature of 500°C or more.

17. A method for forming a silicon oxide layer over a substrate disposed in a high density plasma substrate processing chamber, said method comprising:

(a) flowing a first gas comprising at least one of an inert gas and O_2 into the substrate processing chamber;

(b) forming a plasma having an ion density of at least 1×10^{11} ions/cm^3 from said first gas and allowing said plasma to heat said substrate;

(c) thereafter, depositing said silicon oxide layer by flowing a process gas comprising SiH_4, O_2 and a fluorine-containing source into said substrate processing chamber while maintaining said plasma and allowing said plasma to heat said substrate to a temperature above 450°C during deposition of said silicon oxide layer;

wherein said silicon oxide layer has a fluorine concentration of 1.0 at. % or less.

18. The method of claim 17 wherein said silicon oxide layer has a fluorine content of 0.6 at. % or less.

19. The method of claim 18 wherein a flow rate of said fluorine-containing source is greater than or equal to a flow rate of SiH_4.

20. The method of claim 17 wherein said fluorine-containing source is NF_3.

21. The method of claim 17 wherein said fluorine-containing source is a fluorocarbon having a formula of C_nF_{2n+2} where n is a positive integer.

22. The method of claim 17 wherein a flow ratio of said oxygen-containing source to said silicon-containing source is between 1.6-2.5:1 inclusive.

23. The method of claim 20 wherein a flow rate of NF_3 is between 50-150 sccm and a flow rate of SiH_4 is between 50-150 sccm.

24. The method of claim 23 wherein a flow rate of NF_3 is greater than or equal to a flow rate of SiH_4.